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NASA TECH BRIEF

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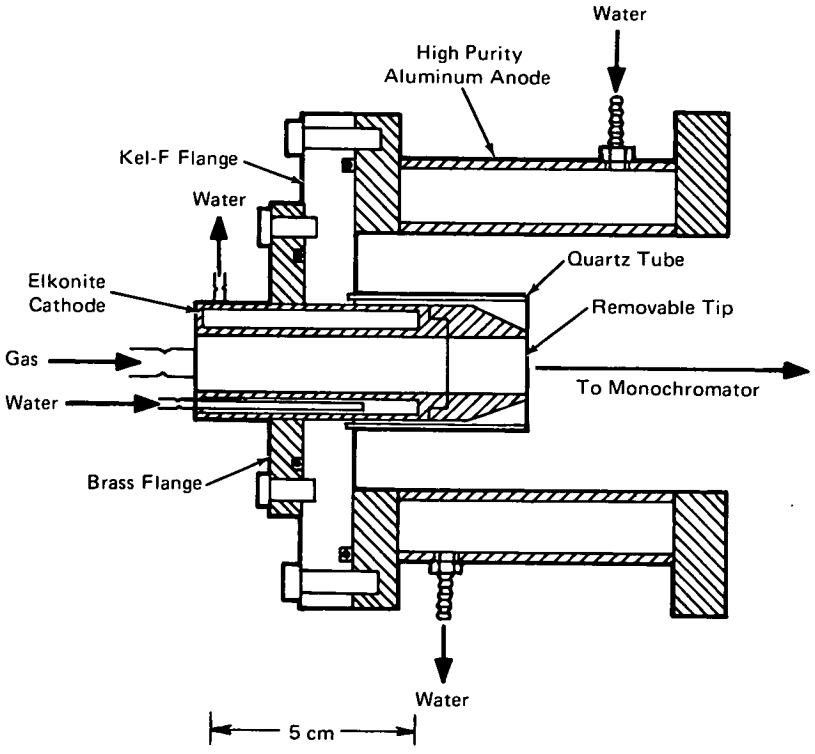
High-Intensity Source of Extreme Ultraviolet



The problem:

Most of the high intensity sources of extreme ultraviolet (UV) radiation have been subject to some limitations, such as noise, especially below the 500 Å range.

The solution:

A high intensity ultraviolet source has been developed which is suitable for emission below 500 Å. The source, useful for the 100 to 1000 Å range, is simple and inexpensive to construct, easy to operate, and very stable.

How it's done:

A diagram of the ultraviolet source is shown in the figure. An important feature of this design is that the discharge is confined in such a manner that the negative glow of the gas discharge can be viewed directly. Most of the ionic line emissions are produced in this region and can, therefore, be observed with little or no absorption by the intervening neutral gas in the positive column.

The ultraviolet-source cathode is a hollow tube made of elkonite, a copper-tungsten alloy that is easily

(continued overleaf)

machined and offers the advantage of a low sputtering rate and high heat conductivity. The cathode dimensions are 1-cm inner diameter and 2.5-cm outer diameter. A thin quartz tube protects the cathode from ion bombardment. The cathode is welded to a brass flange 8 cm in diameter that, in turn, is sealed with an O-ring to a 12-cm diameter Kel-F flange. This flange electrically isolates the cathode from the anode. The anode, is a double-walled cylinder constructed of high-purity 1100 aluminum alloy. Both the cathode and anode are water cooled.

The ultraviolet source is energized by a conventionally stabilized dc voltage power supply which is connected in series with an air-cooled ballast resistor bank of approximately 3-kilohms resistance. The discharge current can be varied between 50 and 800 mA at voltages between 500 and 2000 V. For the highest discharge currents, water cooling is provided at a rate of 3 liters/minute for the anode and 1 liter/minute for the cathode. Because of the sufficiently intense output spectrum, this source can be used with a monochromator at wavelengths as low at 160 Å.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
NASA Headquarters
Code KT
Washington, D.C. 20546
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Patent status:

No patent action is contemplated by NASA.

Source: E. Paresce, S. Kumar, and S. Bowyer of
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